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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/644,605	08/24/2000	Patrick Briot	PET-1875	2407

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EXAMINER

NORTON, NADINE GEORGIANNA

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 06/04/2003

20

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/644,605

Applicant(s)

BRIOT ET AL.

Examiner

Nadine Norton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Withdrawal of Claim Rejections Under 35 USC § 112

Applicants' amendment submitted 3-28-03 in paper no. 19 is sufficient to overcome the previous 112 2nd paragraph rejections.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 4-5, and 7-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Billon (5,525,209) in view of Kydd (4,457,830), Walker (3,507,786), and Cody et al. (5,911,874).

Applicants are claiming a process for producing a high viscosity index oil from a feed containing constituents boiling above 300°C. The process involves a) reacting a feed with a catalyst comprising at least one amorphous non-zeolitic matrix and at least one Group VIII or VIB metal or metal compound; b) fractionating the effluent from step a) to separate at least one

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oil residue comprising mainly constituents with viscosity indices higher than the feed; c) fractionating the residue by thermal diffusion into oil fraction with high viscosity indices. Applicants claim an additional embodiment wherein a portion of the effluent from step a) is brought into contact with a catalyst comprising at least one zeolite, at least one matrix and at least one Group VIII or VIB metal or metal compound prior to being sent to step b).

The reference of Billon et al.(5,525,209) teaches a process for producing an oil with a high viscosity index between 95 and 150 . See column 1, lines 8-11 and column 4, lines 5-10. The process comprises contacting a feed boiling above the temperature above 380°C with a catalyst in the presence of hydrogen. See column 1, lines 42-50. The catalyst contains an amorphous support and at least one Group VIII or VI element. See column 1, lines 48-50. Suitable catalyst supports include alumina, silica, silica-alumina, magnesia and clay. See column 2, lines 5-9. The catalyst further comprises a concentration of VIII or VI metals of 5-40% by weight expressed as the oxides with the weight ratio of the metal expressed as the oxides between Group VIB and VIII between 20 and 1.25. See column 2, lines 22-30. The concentration of phosphorous oxide is less than 15% by weight. See column 3, lines 1-5. First step process conditions include a temperature between 350°C and 430°, a pressure of 2 to 20 Mpa, a space velocity of 0.1 to 5hr⁻¹ and a hydrogen/hydrocarbon ratio of 150 to 2000 by volume. See column 2, lines 39-44 and column 1, lines 52-55.

The reference further teaches that the product obtained from the first step is passed to a second step wherein it is contacted with a second catalyst in the presence of hydrogen. See column 2, lines 49-54. The second catalyst contains a zeolite, a Group VI or VIII metal and a matrix (support). See column 2, lines 57-61. Billon et al.(5,525,209) teaches that the second

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step catalyst can comprise an acid HY having a $\text{SiO}_2/\text{Al}_2\text{O}_3$ molar ratio of 12-40. The reference further teaches that the zeolite has a unit cell size of $24.55 \times 10^{-10} \text{ m}$ to $24.24 \times 10^{-10} \text{ m}$, a C_{Na} greater than 0.85, a specific surface area of greater than $400 \text{ m}^2/\text{g}$, a water vapor adsorption capacity at 25°C of 2.5 torr of greater than 6%, and a pore distribution comprising between 1% and 20% of the pore volume contained in pores with a diameter between 20×10^{-10} and $80 \times 10^{-10} \text{ m}$. See column 3, lines 25-40. The reference also discloses that the zeolite is calcined at 1100°C . See column 3, lines 23-25. The weight of the zeolite with respect to the catalyst is 2 to 80 wt%. See column 3, lines 10-14. Second step process conditions include a temperature between 350°C and 430° , a pressure of 2 to 20 Mpa, and a space velocity of 0.1 to 5 hr^{-1} . See column 3, lines 43-48.

Billon et al.(5,525,209) teaches that the product from the second step is fractionated to obtain a residue containing the oil and middle distillates. See column 3, lines 10-24. A portion of the residue can be recycled. See column 4, lines 14-17.

The reference of Billon et al.(5,525,209) succeeds in disclosing a process for the production of a high viscosity oil. In addition, the reference succeeds at disclosing a process with steps corresponding to applicants' initial hydrogen/catalyst contact, optional secondary catalyst/hydrogen contact, fractionation to obtain a residue and distillates and product recycle. Billon et al.(5,525,209) also discloses applicants' claimed process conditions and catalyst compositions.

Several differences are noted between the reference of Billon et al.(5,525,209) and applicants' claimed invention. The reference does not disclose the use of thermal diffusion to fractionate the residue. Also, the reference is silent about including a vapor/liquid step after the

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first processing step. Billon et al.(5,525,209) is silent about recycling a residue fraction to the first catalytic hydrotreating step.

The reference of Walker (3,507,786) is cited to illustrate that it is known in the art that thermal diffusion can be used to separate hydrocarbon oils by their molecular shapes. See column 1, lines 56-61. The reference illustrates that thermal diffusion techniques are known to obtain different pour point/ V.I. fractions. See column 2, lines 60-72 and 1-15.

The reference of Cody et al.(5,911,874) is cited to show that it is conventional to separate undesirable lower boiling point products such as hydrogen sulfide and ammonia (e.g. gas) from the first stage conversion of product in a two stage hydroconversion process. See column 6, lines 13-21.

The reference of Kydd (4,457,830) illustrates that it is known in the art that the recycle of residual oil can increase the percentage conversion achieved in catalytic hydrogenation processes. See column 1, lines 15-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made desiring to separate the final residue obtained in the Billon et al.(5,525,209) process into selected VI and/or pour point fractions to include an additional thermal diffusion fractionation step because the reference of Walker (3,507,786) illustrates that it is within the level of ordinary skill in the art to separate desired V.I. and/or pour point fractions by thermal diffusion. In addition, it is within the level of ordinary skill to operate the thermal diffusion process at any temperature required to obtain desired product cuts. Applicants have not shown anything unexpected by utilizing a conventional thermal diffusion fractionation step to obtain desired product cuts.

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In addition, applicants' reactor dimensions in claim 13 are not considered to be patentable distinctions because they are apparatus limitations which do not limit the process in a manipulative sense. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select any thermal diffusion column dimensions that would accomplish a desired separation in the process encompassed by the modified teachings of Billon et al.(5,525,209), including the specific dimensions claimed by applicants, because it has been held that invention in a method must be found in the steps performed and not the apparatus employed. Ex Parte Hart 117 USPQ 193 (Bd PatApp & Int 1958).

It would have been obvious to one of ordinary skill in the art at the time the invention was made desiring to remove undesirable gaseous products such as hydrogen sulfide and ammonia produced in the first stage conversion of Billon et al.(5,525,209) to include a vapor separation step to remove such components because the reference of Cody et al.(5,911,874) illustrates that it is conventional to separate gaseous components such as hydrogen sulfide and ammonia in two stage hydroprocessing. Applicants have not shown anything unexpected by including a known separation step in the process of Billon.

It would have been obvious to one of ordinary skill in the art at the time the invention was made desiring to increase the conversion in the first hydrogenative catalytic conversion step of Billon et al.(5,525,209) to recycle the residue obtained after the second step to the first step because the reference of Kydd (4,457,830) illustrates that it is desirable to recycle residue since the percentage conversion in a catalytic hydrogenation process is increased.

Claim Rejections - 35 USC § 103

Claims 6 and 19-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Billon (5,525,209) in view of Kydd (4,457,830), Walker (3,507,786), and Cody et al.(5,911,874).as applied to claims 1-2, 4-5, and 7-18 above, and further in view of Garwood et al.(4,975,177).

A difference is noted between the process of Billon et al.(5,525,209) and applicants' claimed invention. The reference of Billon et al.(5,525,209) does not disclose dewaxing the final residue.

The reference of Garwood et al.(4,975,177) is cited to illustrate the general concept that an additional selective dewaxing step can be used to obtain a "target" pour point. See abstract, lines 4-6. The purpose of selective dewaxing is to remove undesirable waxy components which contribute to an unfavorable pour point without removing the desirable iso-paraffin components which contribute to high VI. See column 10, lines 50-60. Shape selective catalysts including ferrierite can be employed in the selective dewaxing. See column 11, lines 10-11.

Garwood et al.(4,975,177)'s disclosure of ferrierite is considered to encompass applicants' bridge distance limitations because applicants' specifically disclose that ferrierites meet the criteria of the molecular sieve (See applicants' spec, page 8, lines 20-23) used in the claimed invention.

It would have been obvious to one of ordinary skill in the art at the time the invention was made desiring to improve the pour point of the high viscosity fraction to include an additional dewaxing step because the reference of Garwood et al.(4,975,177) teaches that a

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selective dewaxing functions to desirably improve the pour point while maintaining VI.

Applicants have not shown anything unexpected by including an additional known prior art step.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select a dewaxing composition with applicants' bridge distance because Garwood et al.(4,975,177) illustrates that it is conventional to employ a ferrierite which is considered to encompass applicants' claimed bridge distance.

Response to Arguments

Applicants' arguments filed 3-28-03 in paper no.19 have been fully considered but they are not persuasive.

Applicants' arguments asserting that Billon (5,525,209) does not suggest recycling a fraction back to the first hydrogenation step are not persuasive in overcoming the rejection because the secondary reference of Kydd (4,457,830) remedies the recycling deficiency of Billon (5,525,209). One of ordinary skill would have been motivated to modify the process of Billon by including a resid recycling step because the reference of Kydd (4,457,83) teaches that recycling resid to a hydrogenating step desirably increases the conversion.

Applicants' 1.132 declaration filed 3-28-03 in paper no.18 is not considered to show unexpected results. It appears that the results described on page 2 of applicants' declaration were included for the purpose of illustrating that one of ordinary skill would not have been motivated to recycle a resid in the process of Billon (5,525,209) because an increased VI is not obtained. In addition, applicants' appear to be asserting that applicants' process which involves resid recycling produces a product with a high yield in addition to a high viscosity index (see bottom

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of declaration page 3). In response, it is maintained that the applied secondary reference of Kydd (4,457,830) provides motivation to include a resid recycling step in the process of Billon (5,525,209) because it teaches that recycling a resid to a hydrogenation step desirably increases the conversion (increased conversion = increased yield). As a result, it appears that the combination of references suggest applicants' increased yield illustrated in the declaration. In addition, the results shown in the declaration are not commensurate in scope with applicants' claims. Also, it is unclear whether or not the recycled stream's contents are included when the final product yields are calculated in the declaration.

Applicants' arguments against the remaining secondary references (i.e. Cody, Walker, and Garwood) are not persuasive because applicants are relying on different reasons for combining the references than the reasons set forth in the rejections above. For instance, the numerous hydroconversion steps in Cody do not take away from the fact the reference illustrates the conventionality of separating undesirable gaseous products from a hydroconversion zone effluent. Also, Walker was relied on to illustrate the conventionality of employing thermal diffusion to separate hydrocarbons and not to show residual oil recycling. Garwood was relied on to teach the concept of selective dewaxing in order to obtain a desired pour point and not to show resid recycling.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Norton whose telephone number is 703-305-2667. The examiner can normally be reached on Monday through Thursday from 8:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

N.N.

June 3, 2003

NADINE G. NORTON
PRIMARY EXAMINER

Nadine Norton